LARGE MOTOR GENERATOR SET (M.G. SET)
STARTING AND SHUT-DOWN PROCEDURE

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LARGE MOTOR GENERATOR SET (M.G. SET)
STARTING AND SHUT-DOWN PROCEDURE

I. INTRODUCTION

When starting the M.G. set, only half voltage (6 900 v) is used, and the motor starts as a three-phase, wound-rotor introduction type.

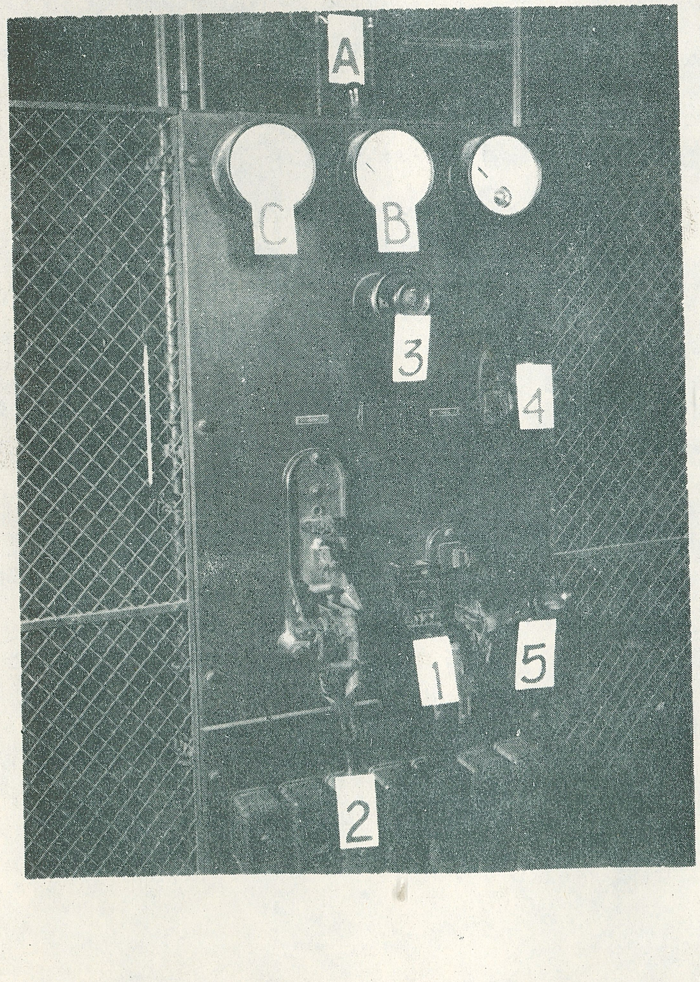
After the D.C. exciter is adjusted to 125 volts, it is fed into the motor's field making the motor a synchronous type.

When the field current has stabilized, the starting 6 900 volts are released and the full 13 800 running volts are quickly applied.

The motor is connected to a three-phase generator with a controlled variable field resistance, operating at 62.5 Hz.

Although provisions are made that each phase can be tied to a separate transformer, all testing is made using a single-phase tied to a single transformer, or three transformers in cascade.

II. STARTING AND RUNNING PANEL WITH LOCATED OPERATING POINTS.



A. Neon bulb.
B. D.C. Volt Meter
C. A.C. Ammeter

1. Under Voltage relay.
2. Starter lever.
3. Resistance control knob.
4. Small D.C. lever
5. Running lever.

D.C. Ammeter (not marked) above #4, D.C. lever.

III. MOTOR-GENERATOR

Step-by-Step Starting and Running Procedure

1. Open generator room wooden doors to garage. Tie left door against stop and leave metal fence door open until M.G. (motor generator) set is running.

2. Open both front windows unless outside temperature is below 40°F, in which case only one window need be opened.

3. Note that neon bulb "A" (top of control panel) is lit. This indicates that the 13,000 volts needed to run the M.G. set are available.

4. Close under voltage relay #1.

5. Be sure that the small D.C. switch, #4, and large running lever, #5, are open with handles in "out" position.

6. Turn resistance control knob, #3, to maximum clockwise position (all resistance in).

7. Disengage catch and lower starting lever, #2, until roller pin is below hammer of the switch mechanism.

8. Close starting lever, #2. Motor will start revolving.

9. While M.G. set is gaining speed, check all six oil rings: rings must be turning on shaft and oil flowing with them. Check oil level in all three cups, at center, and end bearings. The M. G. system will pass through one resonant speed and vibration will be felt for a few seconds.

10. Adjust resistance knob, #3, to maintain 125 D.C. volts.

11. The A.C. Ammeter - "C" - will oscillate between six to fourteen amps as the M.G. set reaches full speed. When the A.C. ammeter "C" cycles to its lowest reading (six ±), close the small D.C. lever, #4. The A.C. ammeter "C" will cut out and the D.C. ammeter (above #4) will register between 25 and 26 D.C. amps.

12. At the completion of Step 11, it will be necessary to readjust the resistance knob, #3, resetting D.C. volts to 125.

13. Before changing from starting to running, be sure that the meters are relatively stable, with no oscillating of the D.C. volt- or ammeter, and only a very slow movement (about two amps) indicated on the A.C. ammeter.

14. Final Step -- to change from starting to running. With the meters stable (as in Step 13) hold the handle of the starting lever, #2, with the left hand and release the catch which holds the lever in place with the right hand. When the catch is free, release the starting lever and allow it to fall open, then very quickly close the running lever, #5. This change from starting to running should be made in no more than two to three seconds.

15. Recheck the D.C. voltage, adjust if necessary with knob #3 to 125 volts. If the M.G. set is started at the beginning of the working hours, this step should be checked at intervals of every two or three hours because of the G.M. room rise in temperature. Because of this temperature rise, the resistance may have to be adjusted to maintain a 125 volt level.

16. Close and latch the south metal screen door, also the M.G. door when returning to the laboratory.

17. Should a problem develop at any time during starting, flip open the under voltage relay, #1; the starting lever, #2, should be open; proceed through the shut down steps.

    Check problem, correct, repeat start-up procedure steps.

IV. M.G. SHUTDOWN PROCEDURE

1. Flip open the under voltage relay, #1. This releases the mechanical holding device and allows the running breakers to open. The running lever, #5, which is now disconnected can be moved to the open position.

2. Turn resistance knob, #3, to maximum clockwise position, thereby putting all resistance in the field circuit.

3. While the M.G. set is slowing down, close the outside M.G. room doors, the metal fence door, and lock them. Close the two windows.

4. The M.G. set should by now have slowed down enough to allow the D.C. ammeter to drop below three amps. When at three amps, or lower, open the small D.C. lever, #4.

5. All necessary disconnections have now been made, and the M.G. set will slowly come to a stop. The door the the laboratory should remain open at end of shut down.

SAFETY

1. Check to be sure the doors and windows are open, as described in Steps 1 and 2.

2. Prior to performing Step 9, remove all loose articles from shirt pockets as they could fall into M.G. set while in motion.

3. Always check the panel before starting M.G. set.
   Check: Mean bulb "A" -- if lit.
   Small D.C. lever #4 -- if open.
   Field switch -- horns and contacts.